UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,458	07/09/2001	Arcangelo Bruna	00CT11053299	5659

27975 7590 08/20/2004

ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A.
1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE
P.O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER	
CHEN, WENPENG	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/901,458	Applicant(s) BRUNA ET AL.	
	Examiner Wenpeng Chen	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) *1-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Specification

1. The disclosure is objected to because of the following informalities.

-- The meaning of expression "S=0, 2" in line 15, page 14 is not clear. Does it mean S=0 or 2? or S=0.2? or S from 0 to 2?

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 15, 20-27, 32-34, and 39-41 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for feature A shown below, does not reasonably provide enablement for feature B below recited in the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to implement the invention commensurate in scope with these claims.

Feature A (in page 15 of the specification) -- The basic compression factor bp_b is calculated summing the *numbers* ZZbits associated with *every* block. A constant value indicating the number of bits required to encode the header of the compressed digital image Jimg then added to the sum. The result is divided by the number of pixels (NxM).

Feature B (for example recited in Claim 20): -- determining a first number of bits required to encode the vector, and summing the first number of bits with a second number of bits required to encode control values, and dividing the sum by a number of elements of the digital image.

The specification requires summing the *numbers* ZZbits associated with *every* block, not ZZbits associated with *a single vector,* with a second number.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 12, 14, 16, 18, 28, and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Yovanof et al. (US patent 5,677,689.)

Because Yovanof uses JPEG compression in their method and system, the specification of JPEG compression is considered part of US patent 5,6777,689. The relevant pages of JPEG standard (Information technology - Digital compression and coding of continuous-tone still

images: Requirements and guidelines, ISO/IEC 10918-1, hereafter referred as ISO/IEC 10918-1) are attached as support of US patent 5,6777,689.

For Claims 28 and 30-31, Yovanof teaches a device for compressing a digital image comprising a matrix of elements, each element comprising at least one digital component for representing a pixel, the device comprising:

-- discrete cosine transform (DCT) means for splitting the digital image into a plurality of blocks, and calculating for each block a group of DCT coefficients for the different types of components; (Fig. 3A; column 4, lines 45-64; column 5, line 67 to column 6, line 4; column 6, line 60 to column 7, line 7; As shown in sections 3.1.23 and 4.8 of ISO/IEC 10918-1, in JPEG, a color image is separated into components. Each component is compressed separately.)

-- quantization means for

quantizing the DCT coefficients of each group using a corresponding quantization table scaled by a gain factor for achieving a target compression factor, (element 322 of Fig. 3A and related text)

further quantizing the DCT coefficients of each group using the corresponding quantization table scaled by a pre-set factor; (element 314 of Fig. 3A)

-- arranging means for arranging the further quantized DCT coefficients a vector; (See Fig. 5, page 16 of ISO/IEC 10918-1; The DCT coefficients are scanned in a zig-zag order into a 1D sequence that is a vector, each component being a component of the vector.)

-- calculation means calculating a basic compression factor provided by the quantization table scaled by the pre-set factor as a first function of the vector; (column 6, lines 19-37; Eq. 2 is the first function with an input being each component of the vector and output being value A. A is considered as a basic compression factor.)

-- estimation second function of the basic compression factor, the second function being determined experimentally according to the target compression factor. (column 5, lines 28-51, Eq. 1 is the second function.)

The above passages also teach the corresponding methods of Claims 12 and 14-15.

For Claims 16 and 18, Yovanof further teaches:

-- wherein the second function is a quadratic function; (equation 1 in column 5)

-- wherein the preset factor is determined experimentally according to the target compression factor. (column 5, lines 28-39)

6. Claims 12, 14, 18-19, 28, and 30-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuniba (US patent 6,697,529.)

Because Kuniba uses JPEG compression (column 1, lines 23-45; column 8, lines 66-67) in their method and system, the specification of JPEG compression is considered part of US patent 6,697,529. The relevant pages of JPEG standard (Information technology - Digital compression and coding of continuous-tone still images: Requirements and guidelines, ISO/IEC 10918-1, hereafter referred as ISO/IEC 10918-1) are attached as support of US patent 5,6777,689.

For Claims 28 and 30-31, Kuniba teaches a device for compressing a digital image comprising a matrix of elements, each element comprising at least one digital component for representing a pixel, the device comprising:

-- discrete cosine transform (DCT) means for splitting the digital image into a plurality of blocks, and calculating for each block a group of DCT coefficients for the different types of components; (column 1, lines 32-36; As shown in sections 3.1.23 and 4.8 of ISO/IEC 10918-1, in JPEG, a color image is separated into components. Each component is compressed separately.)

-- quantization means for

quantizing the DCT coefficients of each group using a corresponding quantization table scaled by a gain factor for achieving a target compression factor, (column 10, lines 25-28)

further quantizing the DCT coefficients of each group using the corresponding quantization table scaled by a pre-set factor; (column 9, lines 63-67)

-- arranging means for arranging the further quantized DCT coefficients a vector; (See Fig. 5, page 16 of ISO/IEC 10918-1; The DCT coefficients are scanned in a zig-zag order into a 1D sequence that is a vector, each component being a component of the vector.)

-- calculation means calculating a basic compression factor provided by the quantization table scaled by the pre-set factor as a first function of the vector; (column 10, lines 1-4; The ACVdata is the basic compression factor and is determined based on the 1D sequence vector.)

-- estimation second function of the basic compression factor, the second function being determined experimentally according to the target compression factor. (equations 10 and 11 in column 10; The function is defined with these two equations. ACVdata is used to determine the value a in equation 10. Then the value a is used to determine NSF in equation 11.)

The above passages also teach the corresponding methods of Claims 12 and 14-15.

For Claims 18 and 19, Kuniba further teaches:

-- wherein the preset factor is determined experimentally according to the target compression factor; (column 9, lines 16-53)

-- storing the DCT coefficients in a memory and concurrently performing the further quantizing of the DCT coefficients for each group using the corresponding quantization table scaled by the pre-set factor, arranging the further quantized DCT coefficients in the vector, calculating the basic compression factor, and estimating the gain factor; and reading the DCT coefficients from the memory for performing the quantizing of the DCT coefficients for each group using the corresponding quantization table scaled by the gain factor. (column 10, lines 25-27; memory 34; Claim 1 of Kuniba clearly shows that the input data shown in column 10, lines 25-27 are DCT coefficients that are stored and can be compressed again with the target scale factor NSF.)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 12-13, 28-29, and 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson (US patent 6,563,535) in view of Yovanof et al. (US patent 5,677,689.)

Anderson teaches a digital still camera comprising:

-- an image acquisition unit for transmitting light corresponding to an image of scene; (column 4, lines 8-34)

-- a sensor unit connected to said image acquisition unit for providing a digital image of scene, the digital image comprising a matrix of elements, each element comprising at least one digital component for representing a pixel, wherein each element comprises a plurality of digital components of different types and wherein each element the digital image comprises a luminance component, a first chrominance component, and a second chrominance component; (column 4, lines 8-34; column 4, line 62 to column 5, line 16; column 15, lines 42-63; Y, Cr, and Cb components)

-- a control device for compressing the digital image and comprising

- a discrete cosine transform (DCT) unit for splitting the digital image into a plurality of blocks, and calculating for each block a group of DCT coefficients for the different types of components; (See comment A below.)

- a quantization unit for quantizing the DCT coefficients of each group using a corresponding quantization table scaled by a gain factor; (See comment A below.)

- a zig-zag unit for arranging the further quantized DCT coefficients in a vector, wherein the vector comprises a zig-zag vector with quantized coefficients representing low frequencies being arranged a beginning the vector, and quantized coefficients representing high frequencies being arranged at an end of the vector. (comment A: column 5, lines 17-51; JPEG block; A JPEG as defined by ISO/IEC 10918-1 has the DCT unit, the quantization unit, and zig-zag unit. See Fig. 5, page 16 of ISO/IEC 10918-1.The DCT coefficients are scanned in a zig-zag order into a 1D sequence that is a vector, each component being a component of the vector.)

However, Anderson does not teach the details of providing target compression factor and compress the data with the factor as recited in Claim 35.

Yovanof teaches a system for compressing a digital image comprising:

-- a quantization unit for

- quantizing the DCT coefficients of each group using a corresponding quantization table scaled by a gain factor for achieving a target compression factor, (element 322 of Fig. 3A and related text)

- further quantizing the DCT coefficients of each group using the corresponding quantization table scaled by a pre-set factor; (element 314 of Fig. 3A and related text)

- quantization unit quantizes the DCT coefficients for each group using the corresponding quantization table scaled by the gain factor a first operative condition, and quantizes the DCT coefficients each group using the corresponding quantization table scaled by the pre-set factor in a second operative condition; (elements 314 and 322 of Fig. 3A and related text)

-- a processor for calculating a basic compression factor provided by the quantization table scaled by the pre-set factor as a first function of the vector, and for estimating the gain factor as a second function of the basic compression factor, the second function being determined experimentally according to the target compression factor. (column 6, lines 19-37; Eq. 2 is the first function with an input being each component of the vector and output being value A. ; column 5, lines 28-51, Eq. 1 is the second function.)

It is desirable to control the size of compressed image with a target compression in digital cameras so a user can expect to store a predefined number of pictures into a fixed-size buffer. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use Yovanof's compression system in Anderson's JPEG block to determine and use the target Q factor to achieve a target compression because the combination enables a user to store a predefined number of pictures into a fixed-size buffer.

Evidently the above cited passages and combination also teach the method of Claims 12-13 and the device of Claims 28-29.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yovanof et al. (US patent 5,677,689) as applied to Claim 12 above, and further in view of Nakagawa et al. ("DCT-based still image compression ICs with bit-rate control," Nakagawa, Masaki, et al. IEEE Trans. On Consumer Electronics, v. 38, no. 3, august 1992, pages 711-712.)

Yovanof teaches Claim 12 as discussed above.

Yovanof further teaches that (1) the model is specific to a target compression ratio (column 5, line 67 to column 6, line 4) and (2) at least the compression ratios are used (column 9, lines 1-2.) Because the model is specific to a target compression ratio, the coefficient parameters used in equation 1 shown in column 5 is also specific to a target compression ratio. To implement the method, the parameters have to be stored in and retrieved from a memory so Q can be calculated based on equation 1. According the above discussion, Yovanof further teaches:

-- storing a plurality sets of parameters each set of parameters being corresponding value of the target associated compression factor;

-- reading the parameters associated with the current value and estimating the gain factor.

However, Yovanof does not explicitly teach the feature associated with selecting an image quality and target compression factor recited in Claim 17.

Nakagawa teaches :

-- selecting an image quality and determining a current value of the target compression factor as selected image quality. (the last paragraph in page 711)

It is desirable to have flexibility of setting quality of images to be stored and compress them accordingly. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Nakagawa's teaching to set compression ratio for quality of images selected in Yovanof's compression system and compress the images with the associated models because the combination provides a user the flexibility of compress images based on selected quality of images.

Examiner's Comment

10. Claims 15, 20-27, 32-34, and 39-41 are not rejectable if rewritten to correct feature B according to feature A shown above because the prior art fails to teach the following features in combination with other limitations recited the claims that they depend from:

-- determining a first number of bits required to encode the vector for each block,

--*summing* all the first numbers of bits associated with each block *with a second number of bits required to encode control values*, and *dividing the sum by a number of elements of the digital image.*

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Wenpeng Chen
Primary Examiner
Art Unit 2624

August 12, 2004